



DISCLAIMER

THIS PRESENTATION:

- DOES NOT ASSIGN BLAME TO ANY PARTY
- WAS DEVELOPED USING INFORMATION FOUND IN THE NEWS
- MAY NOT CONTAIN THE FULL STORY AS THE INVESTIGATION IS ONGOING
- IS MEANT FOR INFORMATIONAL PURPOSES AND SHOULD NOT BE USED OUTSIDE OF THIS TRAINING COURSE
- A NEW YORK TIMES ARTICLE TITLED: "EVENTS THAT LED TO FLINT'S WATER CRISIS" (1-26-16) WAS USED TO DEVELOP THIS PRESENTATION

HERE IS WHAT HAS BEEN REPORTED IN THE NEWS

- March 2013:** The Flint city council votes to switch the city's water supply from Detroit to the new \$233 million Lake Huron sourced Karegnodi Water Authority (KWA).
- April 2014:** KWA system won't be completed until 2016. Flint begins to draw water from the Flint River (it's temporary back up source).
- October 2014:** General Motors engine plant stops using Flint water because it was corroding their metal parts.





2 identical nails placed
in 2 glasses of drinking
water for 1 month.

Water in one glass
came from Flint, the
other from Detroit.

**Can you guess
which one is
which?**

Challenges in Treating Flint River Water

- Flint River has naturally excessive levels of chloride
 - Chloride reacts with iron pipes to form ferric chloride (FeCl_3)
 - Reaction with iron ties up chloride that should be disinfecting the water
 - Additional chlorine must be added for disinfection
- Organic matter present in Flint River
 - Additional chlorine reacts with the organic matter
 - Reaction produces trihalomethane (THM) by-products
 - THMs well-known for carcinogenic properties
- Flint River has a naturally low pH
 - Reaction with iron and lack of corrosion inhibitors for water treatment help maintain low pH
 - Acidic environment promotes reaction with lead in pipes

ThermoFisher
SCIENTIFIC

HERE IS WHAT HAS BEEN REPORTED IN THE NEWS

- Jan 2015:** Detroit's water system offers to reconnect Flint to its source, offers to waive the \$4 million dollar reconnection fee. Three weeks later, the state's emergency manager Jerry Ambrose, declines the offer.
- Feb 2015:** In a memo to Governor Snyder, officials play down problems and say that the water is not an imminent "threat to public health".

WOULD YOU DRINK THIS WATER?



NOTE THE DATE: THESE SAMPLES WERE DRAWN IN **JANUARY 2015**

Lead in Drinking Water

• Corrosive Water + Lead Pipes = Lead Contaminated Water



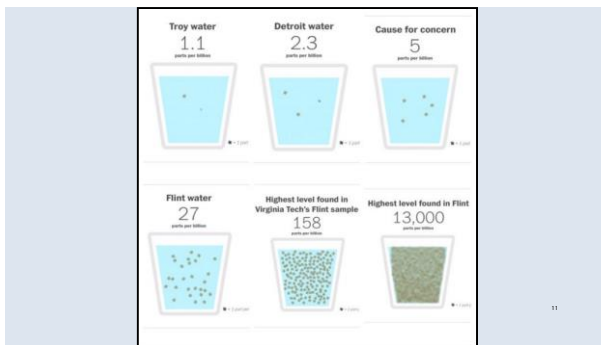
HERE IS WHAT HAS BEEN REPORTED IN THE NEWS

Feb 18, 2015: Drinking water in a home finds lead levels at 104ppb. The report is sent to EPA.

Feb 26, 2015: EPA & Department of Environmental Quality (DEQ) meet to discuss high levels of lead in resident's water samples.

Dr. Edwards found lead in water >15ppb in **25% of the homes tested.**

Highest level of lead in water found by Virginia Tech - **13,200 ppb.**



HERE IS WHAT HAS BEEN REPORTED IN THE NEWS

February 27, 2015: EPA expert, Miguel Toral, says the state was testing the water in a way that could profoundly understate the lead levels.

"Given the very high lead levels found at one home and the preflushing happening in Flint, I'm worried that the whole town may have much higher lead levels than the compliance results indicated."

It is estimated that 6,000 to 12,000 children have been exposed to lead in water.

PERSONAL STORY

- ✓ A MOTHER OF 4 WHO LIVES IN FLINT WAS ALARMED BY THE COLOR OF THE WATER AND THE POSSIBLE EFFECTS IT WAS HAVING ON HER CHILDREN
 - ✓ DAUGHTERS HAIR FELL OUT IN CLUMPS
 - ✓ TWIN BOYS WOULD BREAK OUT IN A SCALY RASH AFTER BATHING
- ✓ LIVES IN A HOME THAT IS LEAD SAFE
- ✓ FLINT OFFICIALS TESTED HER WATER IN **FEBRUARY 2015** - IT HAD **104 PPB**
- ✓ THEY TESTED AGAIN IN **MARCH 2015** AND IT WAS **397 PPB**

PERSONAL STORY

- ✓ WATER TESTING RESULTS WERE PROVIDED TO EPA
- ✓ EPA OPENED AN INVESTIGATION
- ✓ DR. MARC EDWARDS OF VIRGINIA TECH COLLECTED OVER 30 SAMPLES FROM HER HOME
 - ✓ RESULTS RANGED FROM **200 PPB** TO AS HIGH AS **13,200 PPB**

EPA CATEGORIZES WATER CONTAINING >5,000 PPB AS **HAZARDOUS WASTE**

HERE IS WHAT HAS BEEN REPORTED IN THE NEWS

- Aug 2015:** Raw water test results 11ppb of lead in water from Jan-June. DEQ tells Flint-optimize corrosion control.
- Sept 2015:** V.T. expert, Dr. Marc Edwards, reports the corrosiveness of the water is causing lead to leach into the water supply. DEQ disputes those findings.
- Sept 2015:** A group of docs lead by Dr. Mona Hanna-Attisha urges the city to stop using Flint River water after finding high levels of lead in the blood of children. State regulators insist the water is safe.

HERE IS WHAT HAS BEEN REPORTED IN THE NEWS

- March 2015:** Flint hires a private consultant, Veolia, who reports the city's water meets state and federal standards, it does not report specifically on lead levels.
- July 2015:** Governor Snyder's chief of staff, expresses concern about the lead, asks for additional info on Flint water test results and blood lead testing of children.

HERE IS WHAT HAS BEEN REPORTED IN THE NEWS

- Sept 28, 2015:** Governor Snyder briefed on lead by DEQ & EPA.
- Oct 1, 2015:** Flint officials urge residents to stop drinking the water after state epidemiologist validate Dr. Hanna-Attisha's findings. Gov Snyder orders distribution of water filters, expands water testing in schools, and the expansion of water and blood lead testing.
- Oct 16, 2015:** Flint is re-connected back to Detroit water.

ARTICLE FROM THE AMERICAN JOURNAL OF PUBLIC HEALTH

Am J Public Health. 2016 Feb;106(2):283-90. doi: 10.2195/AJPH.2015.303003. Epub 2015 Dec 21.

Elevated Blood Lead Levels in Children Associated With the Flint Drinking Water Crisis: A Spatial Analysis of Risk and Public Health Response

Hanna-Attisha M¹, LaChance J¹, Sader RC¹, Champonee-Schnapp A¹.

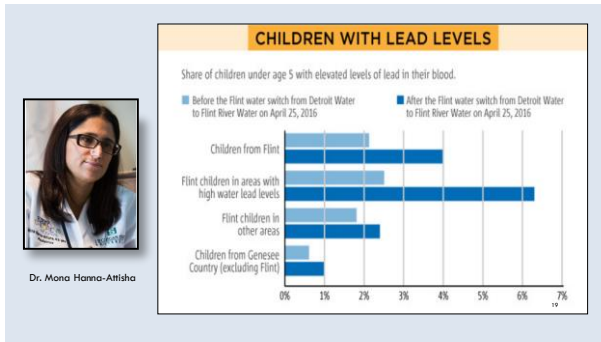
@ Author information

Abstract
OBJECTIVE: We analyzed differences in pediatric elevated blood lead level incidence before and after Flint, Michigan, introduced a more corrosive water source into an aging water system without adequate corrosion control.

METHODS: We reviewed blood lead levels for children younger than 6 years before (2013) and after (2015) water source change in Greater Flint, Michigan. We assessed the percentage of elevated blood lead levels in both time periods, and identified geographical locations through spatial analysis.

RESULTS: Incidence of elevated blood lead levels increased from 2.4% to 4.9% ($P < .05$) after water source change, and neighborhoods with the highest water lead levels experienced a 6.6% increase. No significant change was seen outside the city. Geospatial analysis identified disadvantaged neighborhoods as having the greatest elevated blood lead level increases and informed response prioritization during the now-declared public health emergency.

CONCLUSIONS: The percentage of children with elevated blood lead levels increased after water source change, particularly in socioeconomically disadvantaged neighborhoods. Water is a growing source of childhood lead exposure because of aging infrastructure.



HERE IS WHAT HAS BEEN REPORTED IN THE NEWS

Oct 19, 2015: DEQ Director, Dan Wyant, reports that his staff used inappropriate federal protocol for corrosion control.

Oct 21, 2015: Governor Snyder announces that an independent advisory task force will review water testing in Flint.

Dec 9, 2015: Flint adds additional corrosion control.

Dec 14, 2015: Flint declares a state of emergency.

HERE IS WHAT HAS BEEN REPORTED IN THE NEWS

Jan 5, 2016: Governor Snyder declares a state of emergency for Genesee County, which includes Flint.

Jan 16, 2016: President Obama declares a state of emergency allowing FEMA to provide up to \$5 million in aid.

LET'S TALK A LITTLE ABOUT CONNECTICUT

WEBINAR BY DPH DRINKING WATER SECTION ON MARCH 17TH, 2016:

A RECORDING OF THE PRESENTATION CAN BE FOUND ON WWW.TRAIN.ORG
GO TO COURSE #1062854 CT HEALTHY HOMES: CONNECTICUT'S APPROACH TO
PUBLIC DRINKING WATER AND PUBLIC HEALTH PROTECTION

DWS RESPONSIBILITIES

- MINIMIZE THE RISK TO THE PUBLIC'S HEALTH THROUGH PROTECTIVE MEASURES
- PROACTIVELY PROTECT PUBLIC DRINKING WATER SOURCES
- TRACKING OF SAFE DRINKING WATER ACT (SDWA) COMPLIANCE & REPORTING TO EPA
- PROACTIVE ENFORCEMENT OF:
 - VIOLATIONS,
 - FOLLOW-UP WITH SYSTEM OWNER,
 - ISSUE NOVS AND ORDERS TO ASSURE SYSTEM COMPLIANCE
- SYSTEM TAKEOVER IF FAILURE, SYSTEM REVIEW, VIOLATIONS, ETC.

RELATIONSHIP BETWEEN L&HHP AND DWS

- DWS AND L&HHP ARE TALKING
 - MAKING REFERRALS TO ONE ANOTHER
- DEVELOPING A PROTOCOL ON HIGH LEAD LEVELS REPORTS THAT DO NOT TRIGGER THE LEAD & COPPER RULE
- ASSISTING EACH OTHER WHEN WE CAN

25

WHAT'S HAPPENING NATIONALLY

- LOTS OF ATTENTION ON LEAD
- MULTIPLE SENATORS ARE DISCUSSING WAYS TO ASSIST STATES WITH LEAD POISONING PREVENTION AND ABATEMENT
 - SENATOR CHRIS MURPHY WILL BE PROPOSING A TAX CREDIT FOR PROPERTY OWNERS WHO PERFORM LEAD ABATEMENT
- EPA IS DEVELOPING GUIDANCE TO ASSIST STATES AND WATER OPERATORS
- LEAD & COPPER RULE WILL MOST LIKELY CHANGE
 - IT WILL TAKE TIME TO IMPLEMENT

26

WHAT'S GOING TO HAPPEN...?

IT'S STILL UNFOLDING SO STAY TUNED

27
